Ministry of
Sustainable Resource
Management

BRITISH COLUMBIA

4100 – 3250 Tunnels Hydraulic Communication Test Emergency Response and Notification Plans

Prepared for:

B.C. MINISTRY OF
SUSTAINABLE RESOURCE
MANAGEMENT

Prepared by:

KLOHN CRIPPEN

SRK Consulting
Engineers and Scientists

SRK Project Reference No:
1CB012.10.106

September 2004

105-04436/

4100 – 3250 Tunnels Hydraulic Communication Test Emergency Response and Notification Plans

BC Ministry of Sustainable Resource Management

c/o Golder Associates Ltd
Suite 500,4260 Still Creek Drive
Burnaby, BC V5C 6C6

SRK Consulting (Canada) Inc.
Suite 800, 1066 West Hastings Street
Vancouver, B.C. V6E 3X2
Tel: (604) 681-4196 Fax: (604) 687-5532
E-mail: vancouver@srk.com Web site: www.srk.com

and

KLOHN CRIPPEN CONSULTANTS LTD.
Suite 500, 2955 Virtual Way
Vancouver, B.C. V5M 4X6
Tel: (604) 669-3800 • Fax: (604) 251-8510
E-mail: gparkinson@klohn.com Web site: www.klohn.com

SRK Project Number 1CB012.10.106

September 2004

Authors:
Graham Parkinson P. Geo

Reviewed by:
Peter Healey P.Eng

Table of Contents

1 Introduction 1

2 4100 Plug Area Description and Access 1

3 Mine Drainage System and Contingency Plans for Alternate Drainage 2

4 Valve Arrangement at 4100 Plug (Emergency Response Information) 2

5 Emergency Resources and Equipment 3

6 3250 Portal Location and Access 3

7 Emergency Procedures 3
7.1 General 3
7.2 Emergency Notification Procedure (ENP) 4
7.3 Emergency Response Plan 4

List of Figures

Figure 1 Location Map
Figure 2 Evacuation Area Plan
Figure 2 Evacuation Route and Muster Area

1 Introduction

This document describes an Emergency Response and Notification Plan for a test to verify that there is a hydraulic communication between the 4100 level tunnel behind the 4100 level plug and the 3250 level portal the locations of which are shown in Figure1. The test is part of an evaluation of the use of the 3250 level as a reservoir overflow. It is estimated that the peak of filling in this test will occur late September 2004.

The previous test filling of the levels above 4100 level to an elevation of almost 250m demonstrated the safety and integrity of the 4100 plug and piping system. The probability of a failure of the plug is very low and almost negligible given the factor of safety of nearly 6. Due to the high impact of flooding on areas downstream, adequate contingency plans are an important part of the Hydraulic Communication Test plan.

Although the probability of a loss of control of flow from the 4100 level is low, the following section provides additional information about specific details and information required as part of the Emergency Response Plan.

2 4100 Plug Area Description and Access

The 4100 plug is located 378 m into the mine from the tunnel portal. The 4100 tunnel drains on a 0.5% grade towards the portal. The tunnel dimensions are approximately 4.3 m wide and 2.7 m high at the plug. The tunnel is divided nearly in half with a 2.3 m roadway on the south side and a 2 m ditch on the north side. Two raises are present on the North side of the 4100 tunnel, the one at 12 m from the portal is partially backfilled and the other at 40m from the portal serves as a passageway for water. The roadway into the tunnel passes over an earth-covered, wooden floor at the second (water pass) raise. This floor should not be considered safe for the passage of machinery without an engineering assessment.

The 4100 portal area is accessible by road through the Britannia Townsite, passing through the residential area north of the mine office, through a blue iron gate and back south over Britannia Creek. The 4100 Portal is adjacent to and upslope of the upper level of the prominent mine concentrator building visible from the highway. The portal area is approximately 200 m east of the office and central exhibit area of the BC Museum of Mining. The portal is 60 m upslope of the main Museum building. The alignments of the Sea to Sky Highway and BC Rail are approximately another 200 m west.

3 Mine Drainage System and Contingency Plans for Alternate Drainage

Normally all mine drainage water passes from the 4100 portal to the 4150 level via a raise near the 4100 portal. In the event of the 4150 level becoming obstructed, water can be routed out the 4100 portal by placing stoplogs in a concrete rectangular weir which is located just upstream of the water pass raise at the sandbag dam. The water diverted from the raise will then pass through the green plastic pipes, out the 4100 level and via underground pipes to the circular outfall dropbox located on the 4150 level about 100 m northwest of the 4100 portal.

Normally the 4150 level drains via a culvert at the north end through a weir and into the east side of the outfall drop box. Water flow is normally routed to the outfall via this dropbox but can also be routed to the old concrete launders to the north in an emergency by removing the stoplogs at the dropbox weir if the outfall pipes are compromised.

4 Valve Arrangement at 4100 Plug (Emergency Response Information)

4" Gate Valve	• 8 bolt pattern, 0.835 inch thread diameter, 1.300 inch across flats of bolts, bolt spacing 3.035 inch • pipe wall thickness 0.300 inch
6" Gate Valve	• 12 bolt pattern @7cm (2.75 inch) spacing between bolts • pipe wall thickness 0.425 inch
10" Gate Valve	• 16 bolt pattern. 1.085 inch thread diameter 1.635 inch across flats of bolts 2.95 inch between bolts • pipe thickness 0.400
10" pipe to 6" pipe centre to centre distance = 0.73m horizontally 10" pipe to 4" pipe centre to centre distance = 1.4m vertically 10" pipe centre above muck on floor = 0.24 m	

Valves and Control equipment are maintained by Norpac Controls (Instrumentation), contact is Jeff Quan (604) 422-3790 and Romor Machine Works (Valves and Mechanical), contact is Bob Moran (604) 817-8772.

5 Emergency Resources and Equipment

Contractors in Squamish and Britannia operate excavators, backhoes and other equipment if needed. Contact is Maurice Neil, Property Manager, (604) 896-2221.

Drilling equipment to handle pipe blockages as well as grouting equipment to control seepage or leaks around the plug or pipes is on hand with Foundex Drilling. Contact is Ed Fulop, Operations Manager, (604) 594-8333.

Minor Pipe leaks can be dealt with under pressure by Pacific Flow Control, Contact is Louise Boyko, (604) 888-6363.

Emergency repairs to the pipes and supports can be made onsite by Ideal Welders, Contact is Alex Longo, (604)-525-5558.

6 3250 Portal Location and Access

The 3250 portal is located in an isolated forested area at an elevation of approximately 340m ASL or 260m above the 4100 level. The 3250 portal can be accessed several ways. The portal is located about 125m south of the old inclined railway route passing between the 4100 level and the "Richmond Plywood" road which passes the incline route at 2700 level at the location of the 2700 Armour tunnel and the top of the Raise. Access to the 3250 portal can be made on foot by walking down this incline. Alternately the 3250 portal can be accessed by four wheel drive vehicle from the north from the main road between 4100 and Mount Sheer, exiting the main gravel road at approximately 2.5 km from the blue access gate.

7 Emergency Procedures

7.1 General

This section defines responsibilities and co-ordinates actions required if evacuation of the area downstream of the mine reservoir becomes necessary.

In the event of an emergency related to a clearly impending uncontrolled release of water (i.e. progressive pipe/valve/plug failure) the primary responsibility is to ensure the safety of those at risk. The area at most immediate risk and requiring immediate evacuation is the area between the Mining Museum and the highway. To a lesser extent the eight residents of the 5 house trailers located along Main Street in the South East fan area of Britannia Beach may also be affected by flooding and this area must also be evacuated (see Figure 2). The Ninety Niner Restaurant has been designated as the

muster point for persons evacuated from any potentially flooded area as shown on Figure 3. The telephone number of the restaurant is listed below.

Residents that have been evacuated shall be directed to the designated safe muster point to allow confirmation that all residents present have been contacted.

7.2 Emergency Notification Procedure (ENP)

During business hours, the emergency telephones at either the 4100 portal or the 4100 plug will be used to contact the Mine Manager to alert staff at the Mining Museum of pending evacuation. The next action is to telephone Britannia Beach Properties, who will alert the residents of Main Street, then contact Police/Fire Services requesting assistance in evacuation and road/rail closure. After business hours, contact Squamish RCMP directly for assistance in evacuation. Next alert project engineers and the Mines Branch for technical assistance and for assistance with implementing the emergency response plan.

Contact numbers and the emergency procedures including a plan showing evacuation routes and the muster area (Figure 3) are posted at the mine managers office, the 4100 plug and the 4100 portal emergency telephone locations. Locations of areas considered to be at risk from potential flooding are depicted in Figure 2 of this document, which will be circulated to the Squamish RCMP, Britannia Bay Properties and the Mining Museum. A public notice informing residents of the test with contact information for details regarding the Emergency Response Plan will be posted at several locations in the community.

7.3 Emergency Response Plan

In the event of concerns over non routine conditions at the plug (increases in seeps of water, minor signs of distress at the plug, vibration at the valves, overflow in the drainage system, excess turbidity, blockage of flow, other non life threatening problems) immediately contact the Mine Manager to initiate remedial actions. Also notify the project engineers (SRK / Klohn Crippen) and project Managers (Golder and Associates) for direction regarding appropriate action. The project Managers shall notify Mines Branch of the emergency condition..

In general, if the drainage system is functioning normally and remote systems are functioning or access to the plug is safe, opening of the valves to a position resulting in flows of 300-500 l/s is an appropriate action if problems emerge during the plug test. In the event of power failure the remote systems will hold the last position of the valve and resume without incident after power is restored. An emergency handwheel is located at the plug to close the control valve manually.

Two alternate drainage systems exist to convey water from the 4100 portal in the event of a blockage or malfunction of the normal drainage system. In the event of a blockage in the 4150 level water flow can be diverted into the 4100 portal overflow pipes by placing the timber stoplogs in the concrete flume upstream of the 4150 raise. In the event of a blockage in the outfall culvert leading to

the submarine discharge pipe water can be diverted from the dropbox structure at the 4150 level into the old Parshall flumes and into the timber flume by removing the stoplogs in the 4150 flume near the dropbox. This will result in diverting the majority of the mine drainage into the concrete launders above Britannia creek.

Persons responsible for initiating Emergency Response Plan

(as a result of a reported non-routine situation):
Primary person responsible for initiating Emergency Response Plan:

Britannia Mine Manager:

Terry Johnson: Home (604) 921-8821, Mobile (604) 506-0381, Office 1(604) 896-0276

Office is located at 1502 Copper Drive, Britannia Beach

Acting Mine Manager: (In Terry Johnson's Absence)

Will Trythall: Home (604) 922-8959, Mobile (604) 908-5760

Additional Persons to be contacted in the event of implementing the ERP:

Chief Inspector of Mines

Fred Herman: Office (250) 952-0494

District Inspector of Mines

Ed Taje: Office (250) 952-0732, Mobile (250) 889-3112, Residence (250) 743-2590

Owner's Representative

Barry Azevedo: MWLAP Office (604) 582-5309, Mobile, (604) 612-8536

Project Manager

Gerry O'Hara, Golder Associates: Office (604) 296-4216, Mobile (604) 802-6517

Project Engineers

Klohn Crippen Office: 604-669-3800

Graham Parkinson:	Office 604-251-8525, Home 604-980-7067, Mobile 604-617-2365
Len Murray:	Office 604-251-8580, Home 604-943-4460
Al Morrison:	Office 604-251-8473, Home 604-215-0674

SRK Office: 604 681- 4196

Peter Healey:	Office 604-601-8420, Home 604-985-6751; Mobile 604-619-6753

Evacuation Muster Area

Parking lot in front of Ninety - Niner Restaurant 1-604-896-2497

Britannia Area Emergency Response Numbers

AMBULANCE:	604-892-5422
FIRE:	604-892-3082
Squamish RCMP:	604-892-6100 or 911 via cellphone

Other Numbers

Britannia Bay Property Ltd.	604 896-2221
BC Museum of Mining	1-800-896-4044
BC Rail	604-986-2012
Fisheries and Oceans Canada	604-666-3500
Foundex Drilling	604 594-8333
BC Hydro	1-888-769-3766
Highway Hazard Reporting	604-983-2411
BC Environment	604-582-5200
Black Tusk Helicopters	604-898-4800
BC Emergency Reporting	1-800-663-3456

This report, **1CB012.10.106, 4100 – 3250 Tunnels Hydraulic Communication Test, Emergency Response and Notification Plan,** was prepared by:

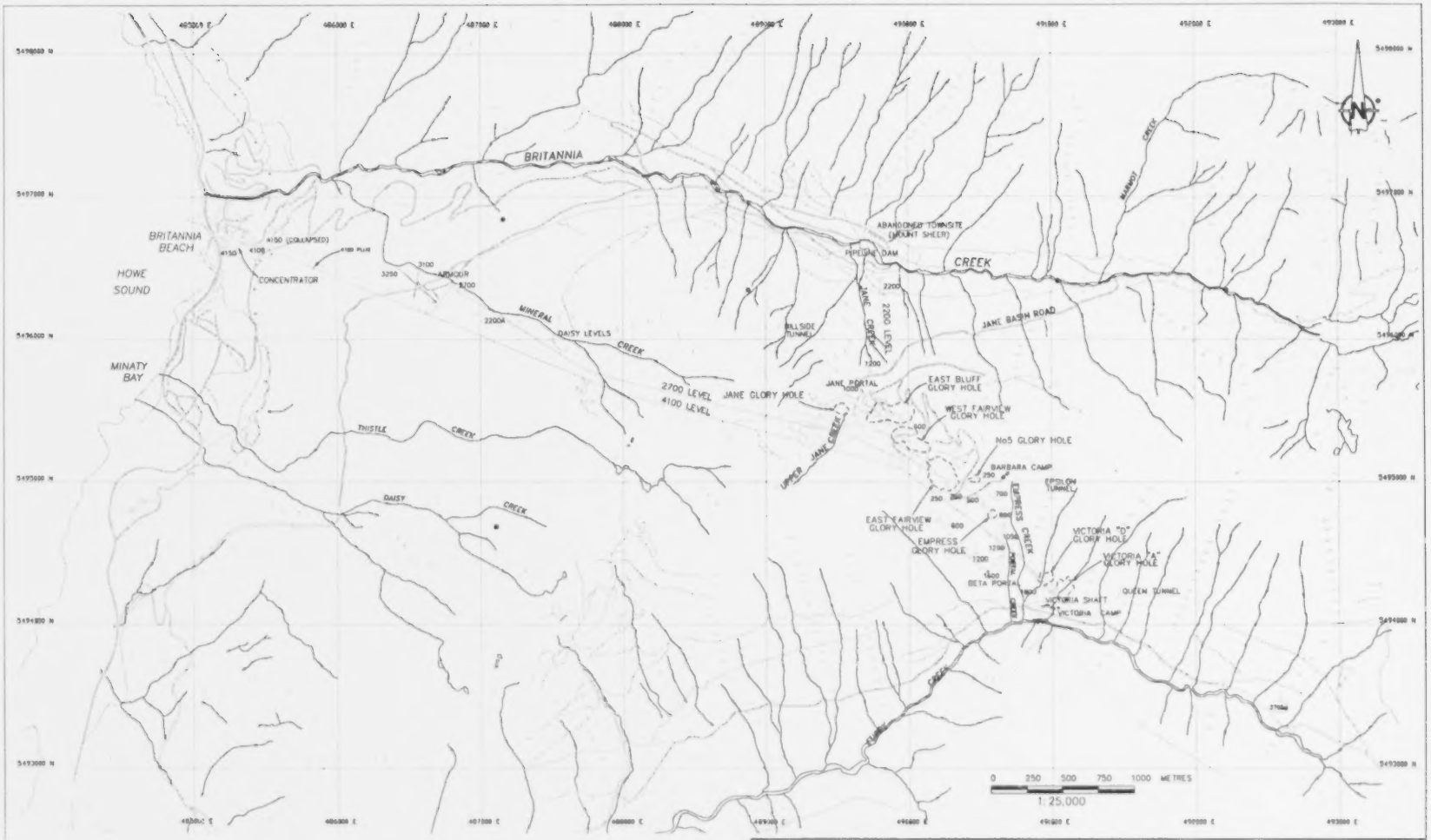
KLOHN CRIPPEN CONSULTANTS LTD.

Graham Parkinson, P. Geo

SRK CONSULTING (CANADA) INC.

Peter Healey, P. Eng.
Principal Consultant
GeoEnvironmental Group

Figures



CONTOUR INTERVAL = 10m
GRID: UTM zone 10
DWG REF: Richmond Plywood, 1994 and Aerogeometrics, 2002

LEGEND

PORTAL
ROAD
GLORY HOLE

2200 LEVEL
2700 LEVEL
4100 LEVEL

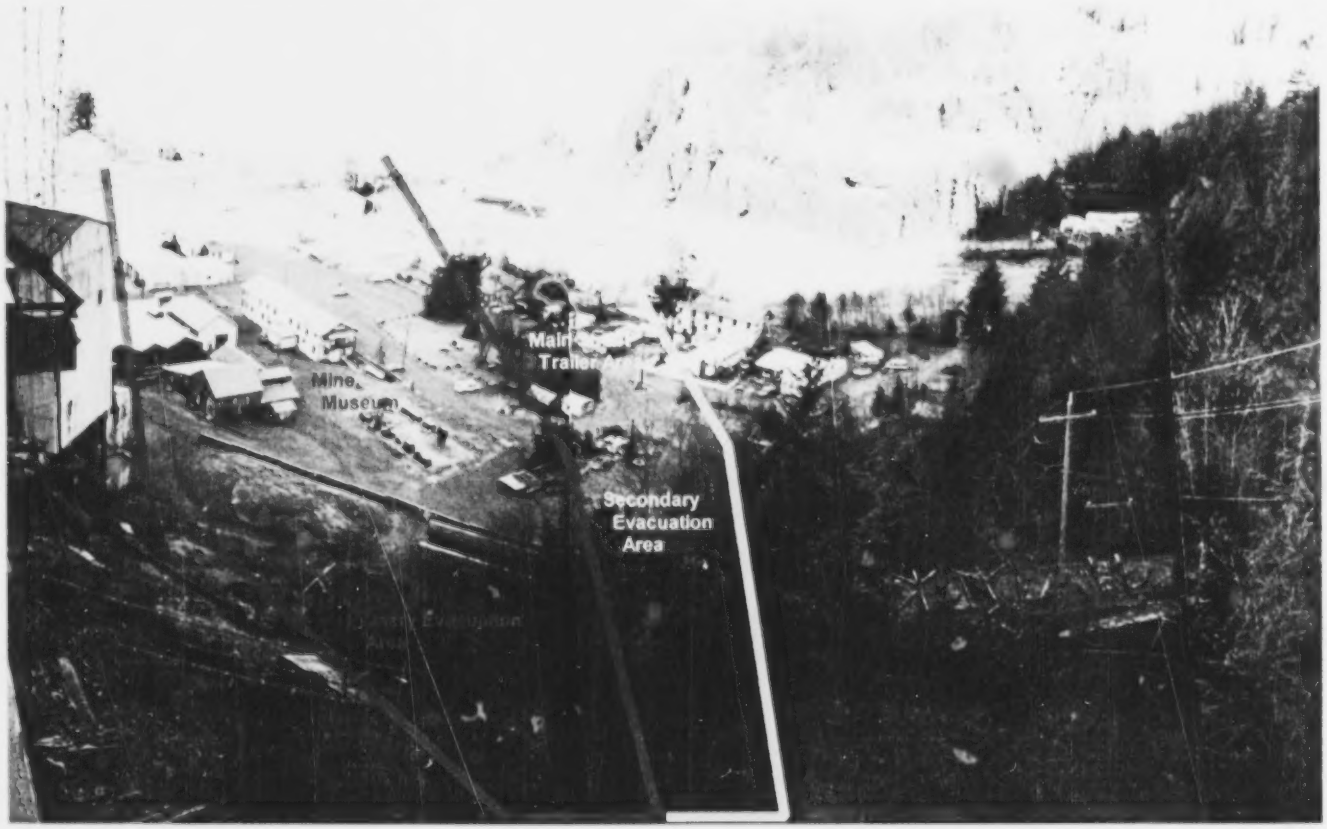
SRK Consulting
Engineers and Scientists

Ministry of Sustainable Resource Management
British Columbia

BRITANNIA MINE REMEDIATION

LOCATION MAP

PROJECT NO	DATE	APPROVED	FIGURE
1CB012.10.105	August 2003		1



SRK Consulting
Engineers and Scientists

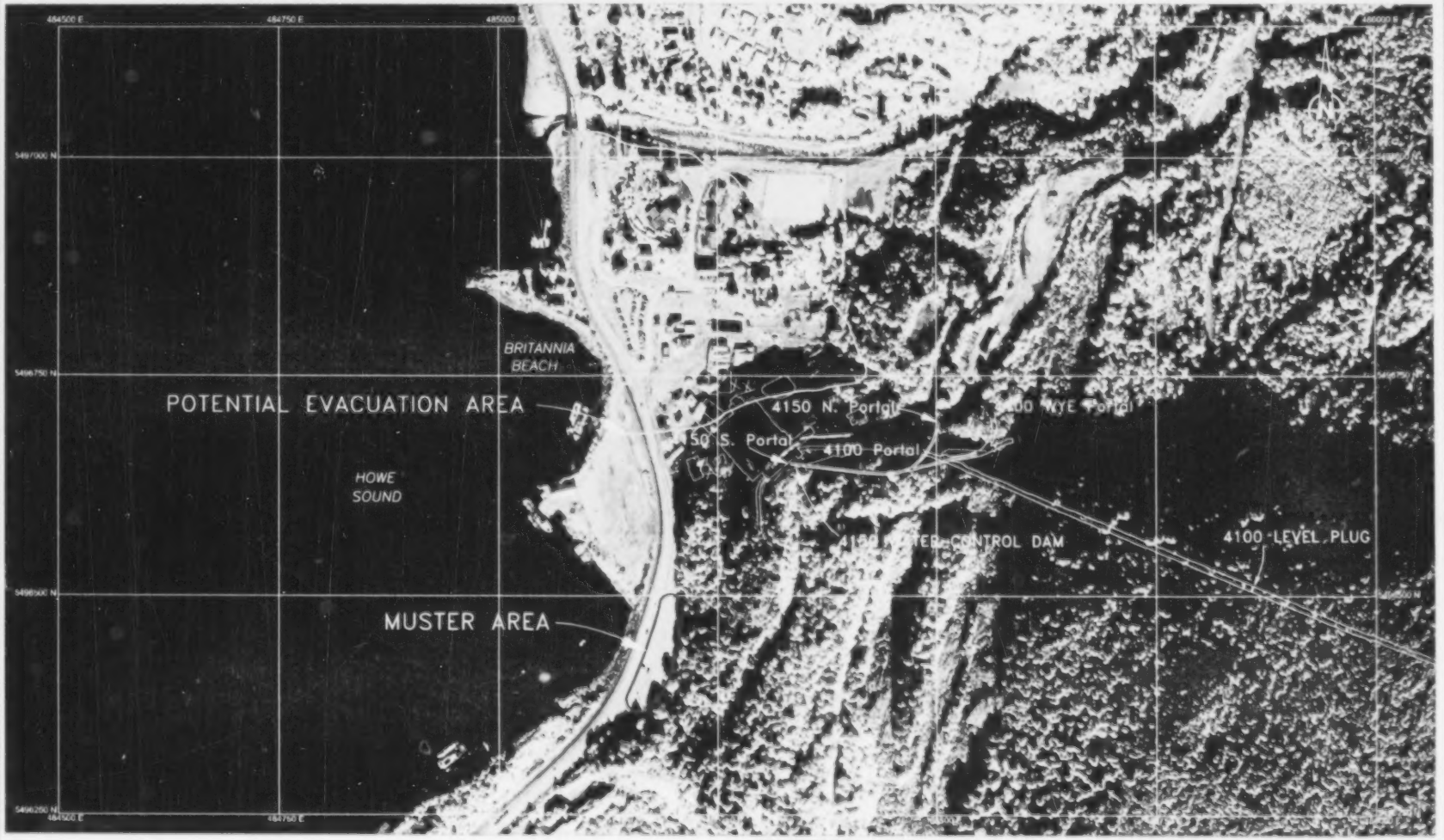
KLOHN CRIPPEN

BRITISH COLUMBIA
Ministry of
Sustainable Resource
Management

Britannia Mine Remediation
3250 Hydraulic Communication Test

Evacuation Area Plan

PROJECT	DATE	APPROVED	FIGURE
1CB012.10.106	Sept. 2004		2



GRID: UTM zone 10

SRK Consulting
Engineers and Scientists

BRITISH COLUMBIA
MINISTRY OF LAND, WATER AND AIR PROTECTION

BRITANNIA MINE REMEDIATION

EVACUATION ROUTE AND MUSTER AREA

PROJECT NO	DATE	APPROVED	FIGURE
1CB012.010.105	Sept. 2004		3